

AN ANALYSIS OF BASKETBALL OFFENSIVE EFFICIENCY RATING

by 149

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ILLUSTRATIONS

CODE FOR TABLE I

Game #	-----	Number of games played to date.
FTA Game	-----	Free throws attempted in the game.
FTM Game	-----	Free throws made in the game.
FT%	-----	Free throw percentage in the game.
FTA Year	-----	Free throws attempted in all games.
FTM Year	-----	Free throws made in all games.
FT %	-----	Free throws percentage in all games.
FGA Game	-----	Field goals attempted in the game.
FGM Game	-----	Field goals made in the game.
FG%	-----	Field goals percentage in the game.
FGA Year	-----	Field goals attempted in all games.
FGM Year	-----	Field goals made in all games.
FG %	-----	Field goal percentage in all games.
REB Game	-----	Rebounds in the game.
REB Year	-----	Rebounds for all games.
Points Game	-----	Points scored in the game.
Points Year	-----	The top number is the seasonal scoring average and the bottom number is the total points per year.
QTS	-----	Quarters played; the top number is for the games and the bottom number is the number played in all games.

CODE FOR TABLE II

+1	-----	Number of Positive Points; one for each rebound, assists, steal, etc.
-2	-----	Number of Negative Points; one for each foul, missed free throw, etc.
Reb.	-----	Rebounds in the game.
Assist	-----	The pass that leads directly to a score.
Def. Save	-----	Defensive save; stopping the offense from scoring by double teaming the player with the ball, or keeping the dribbler from dribbling where he wants.
Fouls	-----	A foul recorded in the scorebook.
FT Missed	-----	Free throw missed.
FT Made	-----	Free throw made.
FG Made	-----	Field goal scored.
FG Missed	-----	Field goal missed.

ILLUSTRATIONS (continued)

Def. Mistakes -----	Defensive errors such as leaving a player unguarded, allowing a player to move freely to the spot that he wished, or leaving the floor with an offensive fake.
Pos. Pts. -----	Number of plus or positive points scored in the game.
Neg. Pts. -----	Number of minus or negative points scored in the game.
Total Points -----	Total scored in the game. Subtract the negative points from the positive points to find the number of points.
Average # Points ---	For all games.

INTRODUCTION

There are many outstanding methods of evaluating the efficiency of team and individual performance in the game of basketball. Many highly respected coaches feel that it is necessary to use all possible statistics for the purpose of evaluating the performance of the team. The charting of nearly everything that a player does on a basketball floor gives the coach a better idea of the playing ability of the player. In fact, Glenn Wilkes says:

Rare is the coach in present day basketball who does not use some type of chart to furnish objective data about each game. Even the keenest of basketball minds cannot possibly gather information in the amount and with the accuracy that can be compiled by charting.¹

Statistics of basketball may be designed by the coach for varying purposes. Some things that coaches hope to gain from game statistics are:

1. Field goals attempted, field goals made, violations causing turnovers, rebounds, free throws attempted, free throws made, blocked shots, and defensive maneuvers that keep the offense from scoring.
2. How well the team is performing when it has possession of the ball.

¹Glenn Wilkes, Basketball Coach's Complete Handbook, Prentice Hall, Inc., Englewood Cliffs, New Jersey, 1962, p.283.

3. How effective the team defense is in preventing the opponents from scoring when they have possession of the ball.
4. The individual player performance; is the player functioning at his maximum by eliminating fundamental mistakes?
5. Comparing of individual players to determine the strengths and weaknesses of each player.
6. To eliminate the weaknesses of the team and player by practicing those things which are poorly executed in the game.
7. To have goals set for which the individual and the team must strive in order to improve.
8. In giving the players the experience of knowing the satisfaction achieved when a goal is reached and contrarily, feeling the emotional let-down which parallels failure.

Game statistics may be tabulated to provide information that gives in detail the statistics for the entire year. Free throws shot in a game may be added to the free throws shot during the previous games to provide a cumulative shot record for the year.

In searching for a satisfactory method of evaluating basketball games in a statistical manner, the author was introduced to the "Offensive Efficiency Rating" System which was developed by Paul R. Keller, 16 Woodland Avenue, Delaware,

Ohio.

Paul Keller was a high school basketball coach for nine years and devised the Offensive Efficiency Rating System in the summer of 1960. The first game that Keller charted was the Ohio State-Michigan State game on January 30, 1960. In this game, Ohio State scored 111 points on 98 possessions for an Offensive Efficiency Rating of 1.13. This means that Ohio State scored 1.13 points every time that they had possession of the ball. On the other hand, Michigan State scored 79 points on 94 possessions for a rating of .84 points per possessions.

Keller continued charting Ohio State University for the 1961-'62 season and has developed his Offensive Efficiency Rating to contain not only points per possession, but defense efficiency rating, turnovers, field goal percentage, free throw percentage, and rebound percentages.

PURPOSE

The purpose of this report is (1) to provide informative statistics of the 1966-'67 Clay Center Tigers basketball team and (2) to compare the Offensive Efficiency Rating System with the system of charting already in effect at Clay Center.

It is hoped that the Offensive Efficiency Rating System may be of some value to the success of other basketball teams in the form of aid to the players and to the coaches of the team.

METHOD OF STUDY

In the monthly issue of Wilson Sporting Goods publication of "The Coach", advertisements were made asking coaches in the United States to mail a ten-cent self addressed envelope to Paul R. Keller, 16 Woodland Avenue, Delaware, Ohio. In return the sender would receive information which would explain briefly the Offensive Efficiency Rating System. After this brief explanation, the author was interested enough to mail the necessary \$15.00 for the price of the entire kit.

The information in the Offensive Efficiency Rating System has been tabulated and compiled after years of experience and experiments with it. The material supplied by Mr. Keller is explanatory of his system, thereby offering coaches the information to chart the team during the games. Portions of the Offensive Efficiency Rating Kit are included in the Appendix.

Offensive Efficiency Rating charts were kept during seventeen games of the 1966-'67 Clay Center basketball season. The statistics recorded in this report are those from the 1965-'66 and 1966-'67 Clay Center teams.

REASONS FOR THE USE OF THE OFFENSIVE EFFICIENCY RATING SYSTEM

There are many reasons why the author began using Mr. Keller's Offensive Efficiency Rating System. Hundreds of

coaches throughout the United States are using the system. With this as an encouraging factor, the author decided that this system may be a help to his teams, and should be used for one season to determine if it is valuable to his teams. There are such colleges as Michigan University, perennial big college power; Evansville College, perennial small college power; The University of California at Los Angeles, recent winner of the National Collegiate Athletic Association championship; Ohio State University, and a host of other colleges and high schools. Dave Gunther of Kimball High School in Royal Oak, Michigan, wrote to Mr. Keller, "I think the Offensive Efficiency Rating System is very helpful; you get in black and white exactly where your weaknesses are" The second, and equally important, reason for using the Offensive Efficiency Rating System is the many amazing ways in which a basketball team may be analyzed toward its offensive efficiency. For example, the statistics gathered from Mr. Keller's Offensive Efficiency Rating System Kit will point out exactly what it will take in the way of Offensive Efficiency Rating System statistics to WIN. This is pointed out at a later time.

Since a study of the Offensive Efficiency Rating System was underway prior to the start of the 1966-'67 season, some of the strong points of the Offensive Efficiency Rating System appeared extremely valuable to a coach. The strong points may be very educational to a coach to use as guidelines for

practice sessions previous to the next game.

The Offensive Efficiency Rating System contains most of all, the offensive efficiency of the team. The offensive efficiency of any game may be compared with the offensive efficiency of the latest games. Also, the latest game may be compared to the season's average to determine how well the team played as compared to the team's average performance. If the team's average drops in the late stages of the season, the coach may conclude that his players are getting stale. On the other hand, if the team's offensive efficiency continues to improve during the last part of the season, it would then appear that the players are being handled properly and their interest is high. The specific objective of the Offensive Efficiency Rating System, as stated by Paul Keller, is to show the POINTS PER POSSESSION and not just the points scored. Points in a game actually mean nothing, but points per possession mean everything.²

The values of the Offensive Efficiency Rating System may best be described by a letter written to Paul Keller by a high school coach who won twenty-three games, while losing only twice. The letter is shown in complete form:

Dear Paul:

²Paul R. Keller, Some Values in Paul R. Keller's OER System, (Ditto copy material), p. 18.

"Here is how the OER helped my team to win 23 games while losing only twice.

1. Helped me to analyze more proficiently my team offense and team defense.
2. Helped me to prepare efficiently for my practice sessions.
3. The biggest contribution was giving the players a realization of how valuable statistics were and that turnovers mean victory or defeat. In fact, when we lost the ball by turning it over, my players had an extra incentive in not letting the opposing team score.
4. Players seem to show more interest in where games were won or lost.
5. Worked as a powerful motivation in correcting mistakes during practice sessions.
6. Players set a goal for each game and tried to achieve this goal.
7. Players seemed more stimulated and motivated by the comparison of each game.
8. Helped in analyzing team defense if constantly scored upon.
9. A good teaching aid to winning basketball.

Respectfully,

/s/ Mickey Neal
Head Coach
Riviera Beach High School
Riviera Beach, Florida"

ACQUIRING OF STATISTICS

In acquiring statistics for a basketball game, a coach should do two things: (1) obtain an efficient way of evaluating the team, (2) use an efficient statistician.

³Paul R. Keller, Second correspondence from the desk of Paul R. Keller, p. 2.

Charting is THE most important aspect of game statistics. It is usually difficult to get a satisfactory statistician from the basketball managers. Many high school coaches use boys as managers who are willing to do a great amount of physical work and too often these boys are not capable of charting properly. The reason for this may be that they do not know enough about the game of basketball or that they are not intelligent enough to record the necessary statistics for the coach. As a result, too often, coaches receive incorrect statistics. Incorrect statistics are misleading and may lead the coach in the wrong direction for his practice plans. A coach would be more capable of providing a good analysis of a game without the use of statistics than he could with incorrect statistics. A coach needs to have a person for the sole purpose of charting and this person should know mathematics and have knowledge of the game of basketball. Various methods of evaluating the play of a team have been used throughout the history of basketball. Types of evaluation include statistics on field goals, free throws, and rebounds, and experiments with statistics seem to bring more methods of evaluating the team or individual play.

PREVIOUS CHARTING

With thoughts toward improving the method of evaluation of the team, the author decided to use the Offensive

Efficiency Rating System and compare this method of evaluation to the method of evaluation used in the four years prior to 1966-'67. In these previous four years, both an offensive chart and a defensive chart were used for team and individual evaluation. In Table I, it is evident that the individual player is being evaluated according to his performance of the four main categories of field goals, free throws, rebounds and points scored. Table I is used by the coach primarily to have a cumulative record of the offensive play of the individual in order to establish the trend of his performances. A code explaining the abbreviations used in Table I may be found on Page v.

Another form of evaluation of a team and again especially the individual player is explained in Table II. The player is being evaluated on a variety of offensive and defensive actions. Since the primary difference between Table I and Table II is the addition of defensive summaries into Table II, the title given to Table II is a defensive chart.

The individual is rated by points as explained in the code for Table II. The column, Total Points, is the amount of points achieved during the game by each individual. If this amount is a larger positive number than the column, Average Points, the player has performed better than his season average.

A cumulative record of games provides a team's yearly average indicated in Table II at 6.0. The game average for this Concordia game is 5.4 and is slightly below the season average. Therefore, rating of the team play is possible with this table. A code explaining the abbreviations used in Table II may be found on Pages v and vi.

TABLE II

CLAY CENTER DEFENSE AVERAGE CHART

Date Regional Tourney 1966 Clay Center vs. Concordia at Marysville Score 99-88

Name	Reb.	Assists	Steal	Def.	FT	FG	FG	Def.	Pos.	Reg.	Total Average
	+1	+1	+1	+1	-1	-1	+2	-1		Pts.	Pts.
Newell	+12	+5	+0	+3	-4	-3	+3	+16	-4	-10	+39 -21 +18 12.3
Sexton	+8	+3	+0	+0	-5	-3	+2	+10	-5	-17	+23 -30 -7 3.2
Ryan	+0	+7	+3	+12	-2	-2	+12	+10	-4	-1	+44 -9 +35 12.5
O'Donnell	+2	+2	+2	+7	-3	-0	+0	+0	-0	-4	+13 -7 +6 6.7
Stoffel, R.	+2	+0	+0	+1	-5	-1	+1	+6	-1	-5	+10 -12 -2 5.6
Affolter, J.	+2	+1	+1	+5	-1	-0	+0	+4	-3	-0	+13 -4 +9 3.3
Neill	+3	+0	+1	+4	-5	-4	+0	+14	-6	-0	+22 -15 +7 -1.1
Craig	+0	+1	+1	+3	-2	-1	+1	+6	-2	-0	+12 -5 +7 6.0
Stoffel, D.	+0	+0	+0	+0	-0	-0	+0	+0	-0	-0	+0 -0 0
Affolter, D.	+3	+1	+0	+3	-4	-1	+1	+6	-0	-3	+14 -8 +6 2.7
Swanson, G.	+0	+2	+0	+3	-4	-1	+3	+4	-0	-4	+12 -9 +3 1.7

Yearly Average-----6.0
 Game Average-----5.4

In the last game of the year, Clay Center versus Concordia, two starting players, Newell and Sexton, may be compared as to their performance according to the defensive chart. Newell scored 19 points, and 12 rebounds, and had 18 positive points. Sexton had 12 points, 8 rebounds, and -7 points. If one were to look at the most often studied statistics, rebounds and scoring, Sexton compares favorably with Newell in this game. On the other hand, Newell has 18 plus points compared to Sexton's -7 points. This figure really points up the fact that Newell's yearly average was 12.3; 5.7 points lower than his game total of plus 18. Sexton's yearly average was plus 3.2 and his -7 is quite low. Thereby, indicating that Newell played a better than average basketball game, and Sexton had a very poor performance on this particular night.

Table II suggests that the team average is 5.4 for the final game with Concordia, and the team average for the year is 6.0. Rating of team play is possible through the evaluation of the team defensive average for the game; the conclusion drawn from the Concordia game points out that the game was below the average score.

The range on the defensive scores are from a low of -3.5 in the McPherson High School game to a high of plus 9.7 in the Salina High School game. The Salina game with Clay Center was played on a Tuesday night with the resulting score of Clay Center 69, Salina 51; on the

following Friday night against an equally good team, the score was Clay Center, 53, McPherson 71. The above statistics show that the outcome of the score with McPherson was the poorest performance of the year, while the Salina basketball game was the best of the year, all of which occurred in a short interval of one week.

These statistics collected throughout the 1965-'66 basketball season will be of value in deciding how to prepare a team for a contest between the same two schools during the following year. It is assumed that fundamentals were not the difference in the two games, but rather a mental and morale difference. Tactics must be kept very nearly the same (as much as possible) to the Salina game, but a new approach must be used in the McPherson game.

Statistics in some games in the 1965-'66 season did not show even an average game, even though the coach had the feeling that the game was played well. For example in the Washburn Rural High School game, the team's defensive average was 5.4, as opposed to the average game score of 6.0. This was one of the best games played by Clay Center during the year and in effect the lower score was due to the use of substitutes. The top eight boys had an average of 8.7, far above the season average. The last four substitutes used in the game averaged a -1.00, thus lowering the team average to 5.4. The coach should be somewhat cautious in

relying entirely on these statistics as a fool proof guide to the absolute performance of his team.

As previously indicated, it is possible for the coach to determine the best players on his team when the statistics charted in Table II are in use. The team average is 6.0. When a player averages a score higher than 6.0, his performance is above average. Contrastingly, a player scoring below the average appears to be performing below the average. The range of individual scores is from the top score of 12.5 averaged by Ryan, to the low score of -.11 averaged by Neill. Only three players were consistently above the average, 12.5, 12.3 and 6.7; one scored at the average score of 6.0 with the remaining six players scoring below the 6.0 average.

OFFENSIVE EFFICIENCY RATING

In explanation of the Offensive Efficiency Rating System, it would be best to begin by defining the Offensive Efficiency Rating System and the thirteen (13) steps used in rating the team. Most of the system is based on possessions, points scored, and turnovers; possessions meaning the number of times that a team controls the ball; turnovers meaning the number of times that the team loses control of the ball without a shot at the basket, and the total number of points scored in the game.

The following instructions show how to figure the thirteen items (as explained by Paul Keller).⁴

Item 1 -- To find your teams Offensive Efficiency Rating, divide the total possessions into the number of points scored. Carry the answer to the nearest hundredths.

Item 2 -- You find your opponents Offensive Efficiency Rating in the same way.

Item 3 -- To find a team's Offensive Efficiency Rating potential, subtract the number of turnovers from the total number of possessions and divide that figure into the number of points you score in the game.

Item 4 -- To find the percent of the offensive ability a team uses on a given night, divide your Offensive Efficiency Rating potential into your regular Offensive Efficiency Rating and carry the answer to the nearest tenth of one percent. An easier method is merely subtract the percent of turnovers from 100%. For instance; if a team turned the ball over on 15.7 percent of its possessions, it would have used 84.3 percent of its offensive ability.

Item 5 -- To determine the percent of turnovers of the ball by a team to the opposition, divide the number of possessions into the number of turnovers, and carry to the nearest TENTH OF ONE PERCENT, such as 19.3%

⁴Paul R. Keller, Offensive Efficiency Rating Kit, p. 17.

Item 6 -- Divide the total number of points given up through turnovers by the total number of games played. This will give the average number of points a team has "thrown away" to the opponents through errors of various types.

Item 7 -- Divide the total number of possessions into the total number of possessions on which points are scored to determine the percent of possessions scored on.

Item 8 -- Divide the KEPT possessions (total possessions minus the turnovers) into the number of possessions on which you score to provide details on the percent of kept possessions scored on.

Item 9 -- Divide the total number of times that the team fails to score into the number of turnovers for the percent of scoreless possessions due to turnovers.

Item 10 -- Merely add up the points scored in the first ten possessions of the game and divide by ten, to determine the Offensive Efficiency Rating for the first ten possessions of the game.

Item 11 -- Same as 10, but it is for the last 10 possessions of the 1st half of the game.

Item 12 -- Same as 10, but it is for the first 10 possessions of the 2nd half of the game.

Item 13 -- Same as 10, but it is for the last 10 possessions of the game.

GAME CHART

The game Offensive Efficiency Rating chart, as it appears before the game, contains only the three top lines in Table III, while the rest of the sheet is blank.

Table III contains the headings of the chart used to chart the game and specifically the first quarter of the Lincoln game.

TABLE III
FIRST QUARTER OF THE GAME

TIP	SCHOOL <u>Clay Center</u>		QUARTER # <u>1</u>	SCHOOL <u>Lincoln</u>
	<u>POSSESSIONS-POINTS</u>		<u>TURNOVERS</u>	<u>POSSESSIONS-POINTS</u>
	<u>Clay Center</u>		<u>Lincoln</u>	
1 + 1	1 + 0	1 + 2	1 + 0	
2 + 2	<u>2 + 2</u>	<u>2 + 0</u>	2 + 0 TO (Pass)	
3 + 2	2 + 2	2 + 2	3 + 2	
4 + 2			4 + 2	
5 + 2			5 + 1	
6 + 2			6 + 2	
7 + 2			7 + 2	
8 + 0 TO (D.A. trav.)			8 + 0	
9 + 0			+ 1	
10 + 0 TO (O.B. 3 secs.) E.S. 15-12; 1:41			9 + 2	
11 + 2			10 + 0 TO (trav.)	
12 + 0			11 + 0	
13 + 0			<u>12 + 2</u>	
<u>14 + 2</u>			12 + 14 ---OER 1.17	
14 + 17 --- OER 1.21				

A pre-numbered sheet cannot be used because plus situations may occur, as did for Lincoln in the first quarter between the eighth and ninth possessions. This plus situation was a back court foul before Lincoln had the chance to bring the ball into scoring position. It is possible that the foul resulted from a free throw situation.

The numbers on the Clay Center side of the chart (the left side), numbering from 1 down the sheet, through 14, indicate the numbers of possessions or the number of times that Clay Center had an opportunity to score. The numbers on this left column which follow the plus mark indicates the amount of points scored on that possession. For example, on the first possession of the ball, Clay Center scored 1 point and on the second possession scored 2 points. On the eighth possession, the team scored 0 points due to a turnover (TO) by Dennis Affolter (DA) by the violation of traveling (trav.). Another part of this chart is the use of substitutes as shown prior to possession number eleven. E. S. (Eddie Schmidt) was a substitute with the score 15-12 and 1:41 showing on the clock. This gives the coach an indication of how the team played when substitutes were in the game.

The numbers on the left column, 14 + 17 are the Clay Center totals for the first period. These mean that Clay Center had 14 possessions in the first quarter

and from these, scored 17 points. To find the team's Offensive Efficiency Rating for the first quarter (as indicated in Item #1 on page 16), divide the total possessions (14) into the number of points scored (17). Thus, the Offensive Efficiency Rating for the first quarter was 1.21. The opponents Offensive Efficiency Rating was 1.17. These two totals point up the fact that both offensive teams were able to penetrate and solve the defense for an extremely well played first quarter.

The middle two columns of this chart are entitled TURNOVERS. The left column indicates the turnovers on the part of Clay Center, and the right column shows the turnovers of the opponents. In the Clay Center column, the numbers 1 and 2 on the left show two turnovers in the first quarter. On these turnovers, Lincoln scored a total of two points. For example, the first turnover indicates 1 + 0, which means turnover #1 and 0 points scored by Lincoln as a result of this turnover. The second turnover indicates 2 + 2. This means Clay Center turnover #2, and 2 points were scored by Lincoln on the possession following the turnover. The total for the quarter for Clay Center shows 2 turnovers and 2 points scored as a result of these turnovers.

The turnover chart, explained in the previous paragraph, is a great motivator for a basketball team. The coach may instill pride in the team to hold the opponents scoreless

after a turnover. If a score is not made after a turnover, the turnover has not hurt the team. Pride on defense can be a great contributing factor to playing good defense. This turnover chart provides one good way of instilling pride in team defense.

Table IV provides the chart during the second quarter of the Lincoln game.

TABLE IV
SECOND QUARTER OF THE GAME

SCHOOL Clay Center		QUARTER # 2	SCHOOL Lincoln
TIP 14 + 17	2 + 2	2 + 2	12 + 14
POSSESSIONS - POINTS		TURNOVERS	POSSESSIONS - POINTS
Clay Center		Lincoln	
15 + 2	3 + 0	3 + 0	Press
16 + 0	<u>4 + 0</u>	4 + 0	13 + 0 0 +
17 + 0 19-16; 6:14	4 + 2	5 + 2	14 + 2
18 + 0		6 + 0	15 + 0 TO (trav.)
19 + 0 OB 19-18; 5:39		7 + 0	16 + 2
OE		8 + 2	17 + 2
20 + 1		<u>9 + 2</u>	18 + 2 B + B
ES		9 + 8	19 + 0
21 + 0			20 + 0 TO (Pass)
22 + 0			21 + 0 TO
23 + 0			22 + 0 TO (Charge)
24 + 2 22-22; 3:03			23 + 0 0 +
25 + 0 TO (trav.) TC			24 + 0 TO (Pass)
JA			25 + 0
26 + 2			+ 1 H + 0
27 + 0 TO (Pass) DA			26 + 3 FG + H
28 + 2			27 + 0 TO (Jump)
29 + 2			<u>28 + 0 TO (Dribble)</u>
RS			28 + 26 ---OER .93
30 + 0 0 +			
31 + 2			
<u>32 + 2</u>			
32 + 32 -----OER 1.00			

Possession #13 of Lincoln in Table IV designates that a one-and-one free throw was shot and the first shot was missed; therefore the second shot was not attempted. Possession #18 points out that both free throws of a one-and-one situation were converted into points. Possession #26 provides another interesting situation; Lincoln scored a field goal (FG) and was fouled, and subsequently converted the free throw for a three point play.

Table V contains the chart of the third quarter of the Lincoln game.

TABLE V
THIRD QUARTER OF THE GAME

SCHOOL <u>Clay Center</u>		QUARTER # 3	SCHOOL <u>Lincoln</u>
32 + 32			28 + 26
<u>POSSESSIONS-POINTS</u>	4 + 2	<u>TURNOVERS</u>	9 + 8
	<u>Clay Center</u>		<u>Lincoln</u>
			<u>POSSESSIONS-POINTS</u>
33 + 0 TO (OB)	5 + 0	10 + 0	29 + 1
34 + 0	6 + 0	11 + 1	30 + 1 (TO) (trav.)
35 + 2	7 + 0	12 + 0	+ 0 0
36 + 1 35-27; 6:13	8 + 0	13 + 0	31 + 0 TO (trav.)
37 + 0	<u>9 + 0</u>	14 + 0	32 + 1
38 + 2	9 + 2	15 + 2	33 + 0
39 + 0 TO (OB)		16 + 0	34 + 0 TO (trav.)
40 + 1		17 + 2	35 + 0 0
41 + 0		<u>18 + 0</u>	36 + 0
42 + 2		18 + 13	37 + 0 0 +
43 + 1			38 + 0
44 + 2			39 + 0 TO (Pass)
45 + 0 TO (trav.) JA			40 + 0 TO (Pass)
46 + 0			41 + 0 TO (Pass)
47 + 2			42 + 0 TO (Pass)
48 + 0 45-28; 2:38			+ 1 R + 0
49 + 0 TO (trav.) OE			43 + 0
RS			44 + 2
50 + 2			45 + 0 TO
51 + 2			+ 1 R + 0

TABLE V (continued)

52 + 2 51-31; 1:18	46 + 0
53 + 0	47 + 0
54 + 2 2 + 2	<u>48 + 0</u>
<u>55 + 0 TO (OB)</u>	48 + 32--OER .67
55 + 53 --- OER .96	

Lincoln started the third quarter by getting the tip from the center jump, as shown by the word TIP at the top of the column in Table V. However, starting with their thirty-third possession, Lincoln failed to score for ten straight possessions until they scored with a plus situation after their forty-second possession.

Clay Center scored only 5 points in the third quarter on Lincoln's 9 turnovers. Even so, this was 5 more points than Lincoln scored on the Clay Center turnovers. The third quarter was really the turning point in the game when Clay Center outscored Lincoln 21-6 in this period, with Clay Center's Offensive Efficiency Rating for the quarter being 21 points for 23 possessions, or a .91 Offensive Efficiency Rating for the quarter, as compared to the .67 for Lincoln.

The third quarter was the strong quarter all year for Clay Center, and will be discussed later.

The fourth quarter is a continuation of more of the same in this game and will not be charted. Table VI contains

The final statistics from the Lincoln game which involves all of the items of the Offensive Efficiency Rating System that is explained on pages 16, 17 and 18. The field goal shooting percentages, free throw shooting percentage and rebound percentages for Clay Center are added to the other thirteen items.

TABLE VI
CLAY CENTER-LINCOLN GAME FINAL STATISTICS

OER -----	.99	Item #1
DER -----	.72	Item #2
OER - P -----	1.16	Item #3
% of offense used -----	.85	Item #4
% of time turning ball over -----	.15	Item #5
Points lost on turnovers -----	2	Item #6
% of possessions scored on -----	.50	Item #7
% of kept possessions scored on -----	.63	Item #8
% of scoreless possessions due to TO's ---	.33	Item #9
First 10 possessions of first half -----	1.30	Item #10
Last 10 possessions of first half -----	1.20	Item #11
First 10 possessions of second half -----	.90	Item #12
Last 10 possessions of game -----	.80	Item #13
FG % -----	.50	
FT% -----	.64	
REB.% -----	.58	

Clay Center ended the game with an Offensive Efficiency Rating of .99 compared to the Offensive Efficiency Rating (DER) of Lincoln of .72. The Offensive Efficiency Rating - Potential was 1.16. Item #6 points out that only two points were scored by Lincoln as a result of turnovers by the Clay Center team. The two ten possession periods of the first half indicate a tremendous first half offensive showing

of 1.30 for the first ten possessions and a 1.20 rating for the last ten possessions of the half. These items as listed may be used by the coach as a summary to determine the efficiency of his team.

COMPARISON OF THE DEFENSIVE CHART TO THE OFFENSIVE EFFICIENCY RATING SYSTEM

Another means of comparing the statistics of the Lincoln game is by comparing the defensive chart, which was used as a guideline in the 1965-'66 year, to the Offensive Efficiency Rating chart. In the Lincoln game, both a defensive chart and an Offensive Efficiency Rating chart were kept. As has been explained, the Offensive Efficiency Rating chart indicates that the Lincoln game was the best offensive game of the year, because the lowest points per game difference between the Offensive Efficiency Rating and the Offensive Efficiency Rating - Potential, was achieved in this game.

Out of the fifteen games charted defensively, the Lincoln game was one of the top five games charted. The over all defensive average for the game was 7.7. The top six players in this game averaged 12.2, in this game, and comparing this to the yearly team average of 5.95, it is possible to see that the team played a good game. It is felt that this chart still has merit, and this is mainly in the study of individual accomplishments during the game.

YEARLY OFFENSIVE EFFICIENCY RATING

The Offensive Efficiency Rating System was used in seventeen games of the 1966-'67 Clay Center basketball team. The games not charted were Emporia, the Sacred Heart Invitational Tournament, and the Class A State Tournament. Table VII allows the reader an opportunity to study the offensive and defensive performances progressively throughout the season.

TABLE VII
OFFENSIVE AND DEFENSIVE EFFICIENCY PERFORMANCES

<u>OER</u>	<u>OER-P</u>	<u>DIFFERENCES</u> <u>OER--OER-P</u>	<u>DER</u>	<u>OPPONENT</u>	<u>SCORE</u>
.83	1.05	.22	.68	Concordia	60-41
.79	.99	.20	.82	McPherson	48-51
.91	1.10	.20	.81	Chapman	66-56
.89	1.26	.37	.73	Emporia	63-54
1.02	1.21	.19	.86	Abilene	69-57
1.00	1.17	.17	.67	Manhattan	67-49
.69	1.08	.39	.69	Salina	50-48
.90	1.10	.20	.52	Concordia	65-34
1.04	1.35	.31	.63	Junction City	74-49
1.09	1.40	.31	.70	Abilene	81-51
.95	1.33	.38	1.06	McPherson	53-57
.95	1.22	.27	.93	Manhattan	60-63
.87	1.24	.37	.61	Salina	61-46
.84	1.17	.33	.86	Beloit	61-59
1.10	1.29	.19	.75	Junction City	80-53
1.00	1.43	.43	.90	Abilene	76-62
.99	1.15	.16	.72	Lincoln	74-49
.93	1.21	.28	.76	FINAL AVERAGES	

Just as in the game charts, item number one of Table VII contains the team Offensive Efficiency Rating. To find the Offensive Efficiency Rating, divide the total possessions into the number of points scored.

Table VII indicates that the final Offensive Efficiency Rating is .93. The coach established a goal of .95 for his team. From information in the Offensive Efficiency Rating Kit supplied by Paul Keller, the coach was able to establish a logical goal. Mr. Keller stated that a high school team that scored .90 to .95 would win 75% of its games and a team that scored .95 to 1.00 should win 90%, or more, games. Since the goal of the team was to lose no more than four games, .95 was set as a goal for which to reach. The team realized that .95 was a difficult goal to reach, but also understood that all goals are not reached in the life of a person. Failure to reach a goal is not a disaster, but rather an educational portion of a person's life.

The author, after the close of the season, compared his team record of 20-4, or 83.3%, to those figures in the previous paragraph. Simply meaning that .95, according to Mr. Keller must mean that a team should win about 90% of its games. Thus, a team with a .93 should win between 80% and 85% of its games. The Offensive Efficiency Rating of Clay Center was .93 and the winning percentage was .833.

This points out the apparent accuracy of Mr. Keller's interpretation in the ratings.

Item number two of Table VII shows the Defensive Efficiency Rating or the opponent's Offensive Efficiency Rating and the charter derives this in the same method used for the Offensive Efficiency Rating. The Defensive Efficiency Rating is shown in Table VII, page 30, with the Offensive Efficiency Rating. Note the final Defensive Efficiency Rating is .76. The coach established a goal of .80. The defensive goal of .80 was thought to be rather low, mainly because a Class A school playing primarily Class AA size high schools (10 of the 17 charted were Class AA size high schools, and all remaining were Class A high schools) should have a difficult time holding Class AA powers to lower than .90. The reason behind this low Defensive Efficiency Rating seems to express the theory that defense can be well played with two ingredients, desire and knowledge. If the defensive team has the desire to have a low Defensive Efficiency Rating, they have taken a big step in reaching that goal. The .76 Defensive Efficiency Rating proves that Clay Center played good defense on the average during the year.

Only one team had an Offensive Efficiency Rating of over 1.00 against Clay Center, that being McPherson High School in their 57-53 victory over Clay Center. The

Offensive Efficiency Rating of Clay Center was .95 in that game, above the team average, but not good enough to win. In one other game, Manhattan High School scored a .93 Offensive Efficiency Rating compared to Clay Center's .95, but Manhattan won the game 63-60. The reason for this loss would be explained in the rebounding department, even though the rebound statistics for this game are unavailable.

Item number three is devoted to the Offensive Efficiency Rating - Potential. The Offensive Efficiency Rating - Potential is that number of points that the team is capable of scoring when it keeps possession of the ball. Every team will have turnovers; therefore, the Offensive Efficiency Rating - Potential, will be a higher number than the Offensive Efficiency Rating. The smaller the difference between the Offensive Efficiency Rating - Potential and the Offensive Efficiency Rating, the more efficiently the team played. If the difference is less than .25, the team played a good offensive game. The team Offensive Efficiency Rating was .93 for the year, and the Offensive Efficiency Rating - Potential, 1.21; this gives a difference of .28, slightly over the hoped for .25 difference. Table VII, column three, points out the cumulative difference for the games charted.

The points per game difference between the Offensive Efficiency Rating and the Offensive Efficiency Rating -

Potential of Table VII provides an interesting insight into the caliber of game played on any given night. For example, the best game recorded for the year was the finals of the State Regional Tournament in the Clay Center versus Lincoln game. At the time of the game, Lincoln High School was undefeated, and Clay Center Community High School had lost three games, all to Class AA competition. The Clay Center Offensive Efficiency Rating was .99 and the Offensive Efficiency Rating - Potential was 1.15 for the game, for an outstanding points per game difference of .16. Lincoln's Offensive Efficiency Rating was .72 and the final score of the basketball game was Clay Center 74, Lincoln 49. Clay Center's kept possessions numbered 64 and the total points were 74. The 64 was found by subtracting the number of turnovers in the game, 11, from the total number of team possessions, 75. To find the Offensive Efficiency Rating - Potential, divide 64 (kept possessions) into 74 (points) and the total Offensive Efficiency Rating - Potential, is 1.15.

The points per game difference (.16) multiplied by the number of possessions for the game (75), points up the fact that the Offensive Efficiency Rating - Potential of the Clay Center basketball team was twelve more points than the final score.

The Offensive Efficiency Rating method of evaluating is more important to the study of team play. The poorest

game according to the Offensive Efficiency Rating statistics was in the semifinals of the State Regional Tournament in the Clay Center versus Abilene game. This shows a tremendous contrast in games in two straight nights. The Offensive Efficiency Rating was 1.00 as compared to a 1.43 Offensive Efficiency Rating - Potential, showing a points per game difference of .43. This figure of .43 represents the number of kept possessions of 53 and the total points scored in the game of 76, thereby indicating that the 23 turnovers by Clay Center in the game kept them from having a good chance of scoring well. In other words, if they had the team average number of turnovers of 15 per game, instead of 23, the team would have had 8 more chances to score. With 8 more chances to score, at a 1.00 Offensive Efficiency Rating rate, the team would have scored 8 more points, thus bringing the game score to 84-62, instead of 76-62.

The author realizes that most teams become stale sometime during the season. As an experienced coach, it is felt that the Clay Center basketball team was not playing good basketball after Christmas in the Junction City, McPherson, Manhattan, Salina and Beloit basketball games. The team was not effective, but rather seemed to be relatively slow in reacting to a stimuli. The result was two losses, and three victories, with the

Beloit victory being in an overtime. The following Offensive Efficiency Rating -- Offensive Efficiency Rating - Potential statistics show the problem in detail.

The average Offensive Efficiency Rating -- Offensive Efficiency Rating - Potential points per game difference for the 1966-'67 year was .28. The average in the first eight games was .23. The next five game differences, .31, .38, .27, .37 and .33 bears out the fact that the team was in a period of staleness during this time. The last game of the year against Junction City climaxed this period of staleness when Clay Center achieved a points per game difference of .19. Even though the Clay Center basketball team was winning three of these five games and the Emporia game, which was not charted because it was the longest week night trip, the Offensive Efficiency Rating chart proved that a period of staleness was in effect and that something needed to be done to eliminate the staleness in the team.

One method, which was hoped would help eliminate the staleness in the team took place during the week of the Salina High School game. On Monday evening of this week, practice was canceled hoping to rest the players for the upcoming game. The result was a .37 points per game difference. The next Tuesday, the Beloit game proved a disaster as defeat was evident until the last one-half minute when the Clay Center

Tigers tied the game, and then won in an overtime. Since the team had played another very poor offensive game the coach attempted to overcome the staleness by providing short practices for the team. Shortened practices took place Wednesday and Thursday, and these practices consisted of defensive and offensive strategy, plus some short games of volleyball. Volleyball became part of the practice in hopes that it would relieve some tensions and let the team forget about basketball for awhile. Volleyball may be an asset to a basketball team, and in this instance it was used to help the players regain some fingertip control of the ball and to continue the jumping that is necessary in the game of basketball. This change of pace used in practice apparently paid dividends, as the third best statistics game was played in the next game, Clay Center versus Junction City, with a .19 points per game difference. With this good game performance behind them, the Clay Center Tigers moved through the State Regional Tournament into the finale, where the best statistics game of the year was played. In this game against Lincoln High School, Clay Center had a points per game difference of .16.

Table VIII discloses some of the most important aspects of the Offensive Efficiency Rating System.

TABLE VIII

COMPLETE OFFENSIVE EFFICIENCY RATING

OPPONENT	SCORE	OER	OER-P	PPG	DER	REB.	FT. %	FG. %	TO %	POINTS LOST		POINTS WON
										ON TO'S	ON TO'S	LOST ON TO'S
Concordia	60-41	.83	1.05	.22	.68		.56	.40	.21	4		18
McPherson	48-51	.79	.99	.20	.82	.42	.73	.39	.20	14		10
Chapman	66-56	.90	1.10	.20	.81	.62	.55	.39	.18	7		18
Emporia	63-54	.89	1.26	.37	.73	.56	.55	.37	.30	17		10
Abilene	69-57	1.02	1.21	.19	.86	.51	.68	.43	.16	7		21
Manhattan	67-49	1.00	1.17	.17	.67	.54	.63	.42	.15	8		22
Salina	50-48	.69	1.08	.39	.69	.58	.52	.42	.36	18		15
Concordia	65-34	.90	1.10	.20	.52	.62	.50	.39	.18	4		20
Junction City	74-49	1.04	1.35	.31	.63	.59	.65	.44	.27	11		19
Abilene	81-51	1.09	1.40	.31	.70	.58	.75	.45	.22	11		15
McPherson	53-57	.95	1.33	.38	1.06	.40	.52	.49	.29	18		6
Manhattan	60-63	.95	1.22	.27	.93		.70	.47	.22	17		17
Salina	61-46	.87	1.24	.37	.61	.56	.57	.49	.30	13		16
Deloit	61-59	.84	1.17	.33	.86		.52	.45	.26	10		16
Junction City	80-53	1.10	1.29	.19	.75	.55	.62	.49	.16	4		16
Abilene	76-62	1.00	1.43	.43	.90	.65	.65	.47	.30	17		19
Lincoln	74-49	.99	1.15	.16	.72	.58	.64	.50	.15	2		15
AVERAGE		.93	1.21	.28	.76	.55.8	60.1	43.9	22.8	10.7		16.1

Item number four and item number five (page 16) are two of the most important parts of the Offensive Efficiency Rating. These two items explain the percent of the time that the team loses the ball to the opponents via turnovers. Turnovers are bad passes, traveling, three second lane violation, or offensive fouls. The goal set for number four was 88% of the offense used and 12% of the time losing the ball to the opponents, shown in number five. If the team loses the ball 12% of the time, they would be using 88% of their offense, therefore these two items are based on turnovers. The goal was set too high as the team was unable to come close to this. The percent of offense used for the 1966-67 season was 77.2%, with the percent of time turning the ball over being 22.8%. This seemed rather high to the author as this 22.8% figures to be an average of 15 turnovers per game. One reason for the high figure is that Clay Center used the fast break to a great extent and a team that fast breaks will probably have a higher turnover rate than a team that uses ball control and works methodically for the good shot.

In contrast to the Clay Center turnover rate of 22.8%, the opponents gave the ball away 27.7% of the time for an average of 17 turnovers per game. This is one of the most likely advantages associated with team play. The difference between the Clay Center error rate and that of the opponents is 4.9%. This means that Clay Center used 4.9% more

offense than the opponents and indicates the strength of the defense.

Items four and five are important parts of the Offensive Efficiency Rating System in that quite often a coach does not realize that the team has turnovers. This is a statistical point that can not be disregarded. If a team makes more turnovers than the opponents, it is most difficult to win.

Probably one of the most important parts of the Offensive Efficiency Rating System is item number six, which indicates the points lost to the opponents directly because of the turnovers. A very important aspect of the game of basketball is to score more points per game on the opponent's turnovers than the opponents score as a result of your turnovers. For the year, Clay Center lost 10.7 points per game with a 22.8% error rate. This exemplifies the strength of the Clay Center defense which allowed only 10.7 points per game to be scored on the team's average of 15 turnovers per game. The opponents lost 16.1 points per game to Clay Center with a 27.7% turnover rate. The difference between 16.1 and 10.7 is 5.4 points per game. Clay Center thereby showed offensive efficiency by having lower turnover percents and having lost fewer points on errors than did the opponents. This means that on the average, Clay Center started each game

with 5.4 points per game on the scoreboard. Game to game statistics on the points lost per game for each game are found in Table VIII.

From Mr. Keller's Offensive Efficiency Rating Kit, of the teams that were charted in the 1964-'65 season, the teams with 20% to 25% turnovers won 160 games and lost 52 for a 75.5% winning percentage.⁵ Clay Center's winning percentage was 83.3%. This is a high percentage of wins and shows that other fundamentals of basketball were well executed by the Clay Center squad.

Items seven, eight and nine are the most insignificant portions of the Offensive Efficiency Rating System. These sections expose the percent of offense used in terms of turnover rate. In item number nine, the percent of possessions not scoring due to turnovers is 45.7%, with the pre-season goal being a maximum of 40%. According to this chart, the best game was a 32% game in the finale of the State Regional Tournament against Lincoln. These three charts show nothing that is not shown in items four, five and six; therefore, these statistics are insignificant. Continual explanation of these items would only lessen the understanding of the Offensive Efficiency Rating System.

⁵Paul R. Keller, "Offensive Efficiency Rating Kit", (Ditto copy material), p. 25.

Some of the most interesting statistics of the Offensive Efficiency Rating are the four periods of ten possessions each; the first ten possessions at the start of the game, the last ten possessions of the first half, the first ten possessions of the second half, and the last ten possessions of the game. Each of these four series of possessions tell a very interesting story about each game. In Table IX the Clay Center possessions and the opponent's possessions are indicated.

TABLE IX
TEN POSSESSIONS PERIODS

CLAY CENTER	Last 10 1st 10				OPPONENT	1st	2nd	3rd	4th
	1st 10	First Half	Second Half	Last 10 Game					
Clay Center	.80	1.00	1.00	.90	Concordia				
"	.90	.40	.50	1.40	McPherson	1.20	.80	.78	1.20
"	.90	1.10	.60	1.10	Chapman	1.10	1.30	.60	.60
"	1.00	.70	1.00	.90	Emporia	.50	.80	.50	.70
"	.60	.70	1.30	.90	Abilene	1.00	.80	.60	.60
"	.70	1.00	.80	1.10	Manhattan	.40	.90	.90	.60
"	1.20	.90	1.00	.20	Salina	.20	.80	.50	1.10
"	.90	.80	1.10	1.00	Concordia	.60	.40	.00	1.00
"	.80	1.40	1.30	1.20	Junction City				
"	1.10	.80	1.00	1.00	Abilene	.20	.90	1.40	1.00
"	1.80	.90	.50	.90	McPherson	.50	1.20	1.10	.90
"	.70	.80	1.00	1.10	Manhattan	.90	1.00	.70	1.20
"	.30	1.20	1.10	.90	Salina	.60	1.00	.60	.60
"	.60	.90	1.40	1.10	Beloit	.60	.70	1.00	.70
"	1.50	.50	.60	1.00	Junction City	.90	.60	.70	1.00
"	.90	1.20	1.10	.90	Abilene	1.10	1.30	1.00	.30
"	1.30	1.20	.90	.80	Lincoln	1.20	.80	.20	1.00
AVERAGE	.94	.90	.95	.96	AVERAGE	.73	.88	.71	.83

Average for these 40 possessions--.94 Average for these 40 possessions--.78

If the Offensive Efficiency Rating of the first ten possessions of the game is lower than the game Offensive Efficiency Rating, it could mean that the players were not properly warmed up for the start of the game or they were not adequately prepared for the type of defense played by the opponent. Possibly, the players failed to enter the game with the proper mental attitude. The team's yearly game average of Offensive Efficiency Rating was .93 and the Offensive Efficiency Rating yearly average of the first ten possessions was .94. In two consecutive games early in the season, this series of possessions showed a .60 and .70 Offensive Efficiency Rating. To counteract this poor showing, a new warm-up drill was used prior to the game to stimulate the tempo of the warm-up. The apparent effectiveness of the change is shown in the very outstanding Offensive Efficiency Rating of 1.20 for the first ten possessions in the next game. One will never really know whether the added warm-up drill was the cause of the increased Offensive Efficiency Rating, but the problem was eliminated.

The yearly averages of the other three ten possession periods are as follows:

Last ten possessions of the first half -----	.90
First ten possessions of the second half -----	.95
Last ten possessions of the game -----	.96

In analyzing these four possessions periods, the

coach noted that the team offense was very consistent during these periods. Some teams do not play consistent basketball throughout a game, and these are the teams that have trouble winning consistently. For example, in the 1964-'65 season, Wagner South Dakota High School had .70, .89, .84, and .78 in these four ten possession periods; their record was 15 wins and 8 losses in that year.⁶ The author feels that a team that is inconsistent is either a young team or a team that is not fundamentally sound. If the latter is the reason, the coach who observes his inconsistent team may work harder on the fundamental aspects of basketball. The probable reasons for the consistency of the 1966-'67 Clay Center basketball team were in its experienced personnel, with nine of the first ten players being seniors having a considerable amount of game experience in their high school careers.

To further point out the consistency of the Clay Center team, the total Offensive Efficiency Rating average for these four periods is .94 as compared to the overall Offensive Efficiency Rating average of .93 for the entire game. The .94 is determined by multiplying four times 170 (the number of possessions during the year for each period) to get 680 possessions for the year during these four periods. Divide 680 into 641 (total points scored

⁶Ibid., p. 22.

on these possessions) and the Offensive Efficiency Rating is .94 points per game for these periods. On the other hand, the four period Offensive Efficiency Rating of the opponents is .78 as compared to the game Offensive Efficiency Rating of .76.

The last ten possessions of the game also provides interesting aspects to study in the coaching of a team. If the Offensive Efficiency Rating for this period is lower than the game Offensive Efficiency Rating, it may indicate that the players are not in condition to play the last five minutes of the game as well as at the beginning of the game. Also, if the players built up a high Offensive Efficiency Rating prior to this period, it may indicate that the players loafed after building up a sizeable lead. This fact was noted in a few games in the early part of the year. It was felt that the players possibly lacked the "killer instinct" to go on to a sizeable margin of victory. The coach called this weakness to the attention of the players, then afterwards practice time was used by playing the varsity against a much weaker group of players, stressing that the margin of victory must increase throughout the game and especially in the last few minutes of the game.

The lowest Offensive Efficiency Rating of all four ten possessions periods was the last ten possessions of the first half. This .90 is not extremely low because

the Offensive Efficiency Rating average for the year is only slightly above that at .93. Some low Offensive Efficiency Ratings in this period could be attributed to the use of the substitutes during this period.

One of the most critical periods of any game is the first three to five minutes of the second half. In part, the team's successful 1966-'67 record may be attributed to the very fine Offensive Efficiency Rating during the first ten possessions of the second half. Clay Center's Offensive Efficiency Rating for this period was .95, showing an increase from the .90 achieved in the last ten possessions of the first half. It is important that the players get nearly three minutes of warm-up time before starting the second half. The half time rest quite often may cause a player to move more slowly until he has been able to warm-up completely. The efficient three minute warm-up period helped to ensure the coach that the Clay Center players were prepared mentally and physically for the start of the second half.

In contrast to the Clay Center Offensive Efficiency Rating of .95 in the start of the second half, the opponents were held to a low .69. Since the first ten possessions of the second half are a very critical time in the overall concept of game strategy, the success during this period strengthened the belief that many games were won during this period. After a close first half, the Clay Center Tigers were often able to open a slight lead at the start of the

second half.

Four times during the year the opponents outscored Clay Center in this period and two of these times, the Tigers were defeated. Table IX explains the yearly ten possession periods. The third quarter in the Lincoln game was the turning point in the game. On the average for the first ten possessions of this period, Clay Center scored at a .95 Offensive Efficiency Rating clip, compared to the .71 of the opponents. Because of this vast difference, Clay Center was able to open up a lead in the third period and hold on to a large margin of victory.

In the final ten possessions of the game, the Offensive Efficiency Rating may give the coach a good idea of the physical condition of the team. If the game Offensive Efficiency Rating is higher than this period, it is rather evident that the physical condition of the team is poor. The Clay Center average period Offensive Efficiency Rating was .96 as compared to the game average Offensive Efficiency Rating of .93. Strikingly, of the four periods of ten possessions, the team's strongest ten possessions period was this fourth period, as it is the highest of the three previous ten possession periods. The conclusion drawn from these statistics indicates that the depth of the squad allowed the coach the opportunity to rest players during the game by using a substitute, thereby, readying the players for the strenuous last quarter.

The remaining portions of the Offensive Efficiency Rating charts are the field goal shooting percentage, free throw shooting percentage, and rebounding percentages. The field goal shooting percentage was 43.9%, free throw shooting percentage was 60.1%, and the rebounding percentage was 55.8%.

ANALYSIS OF RESULTS

The four major statistics affecting the Offensive Efficiency Rating System are rebounding, field goal shooting, free throw shooting and turnover rate. Each has a very important effect upon the outcome of a contest. A discussion of the value of each of these statistics follows in the order of their importance.

The 55.8% rebounding is probably the most important statistic. In the finals of the regional tournament when Lincoln's average height was 6' 4", as compared to the Tiger's average height of 6' 1½", Clay Center gained 50% of the rebounds. In the semi-finals of the Class A State Tournament against a Tonganoxie front line of 6' 10", 6' 8" and 6' 3", the Tigers gathered 63% of the rebounds and won by two points to gain the finals of the tournament.

According to the Paul Keller Kit, teams using the Offensive Efficiency Rating System in the 1964-'65 season that averaged 55-60% of the rebounds, as Clay Center did,

won 227 games and lost 59 games for a 79.4%⁷ which is very close to the winning percentage of 83.3% for Clay Center.

The second most outstanding statistic of the Clay Center basketball team was the 43.9% field goal shooting. Only a small percentage of high school teams shoot 44%. From teams using the Offensive Efficiency Rating System in the 1964-'65 season, Paul Keller found that teams shooting from 40-45% won 311 and lost 82 for a 79.1% as compared to a 78.1% winning percentage for this group in the 1963-'64 season.⁸ Again, to compare, Clay Center won 83.3% of their games with the 43.9% shooting percentage.

The turnover rate of the team should not exceed 20% in order to aid an effective offense, but the 22.8% turnover rate is not high enough to be a problem to the team. Since the rate is only slightly above 20%, it is listed as the third most important factor affecting the Offensive Efficiency Rating. Again, teams using the Offensive Efficiency Rating System in 1964-'65 with a 20-25% turnover rate won 160 games and lost 52 games for a 75.5%⁹, as

⁷Ibid., p. 25.

⁸Keller, "Offensive Efficiency Rating Kit", (ditto copy material), p. 26.

⁹Ibid., p. 25.

compared to Clay Center's 22.8% turnover rate and 83.3% winning percentage. The conclusion drawn from this is that the Clay Center winning percentage was higher than those rated in 1964 with the same turnover rate.

The fourth, and least important, of the four major phases affecting the Offensive Efficiency Rating was the free throw shooting. Teams in 1964-'65 which shot at a 60-65% rate won 77.2% of their games and in 1963-'64 won 74.0% of their games.¹⁰ Free throw shooting was not too important in the success of the Clay Center team for the 1966-'67 season, because despite the 60.1%, the winning percentage was 83.3%. The same was true for a very high percentage of colleges and high school teams. The following statistics from schools rated in the 1964-'65 season prove this point:

- A. Teams shooting 55% to 60% had a winning percentage of 78.6%.
- B. Teams shooting 60% to 65% had a winning percentage of 77.2%.
- C. Teams shooting over 65% had a winning percentage of 76.5%.¹¹

The conclusion could be made from these statistics that free throw shooting has little effect upon winning, because those teams shooting over 65% of their free throws had a poorer winning percentage than those teams shooting 55-60%

¹⁰Ibid., p. 26.

¹¹Ibid.

"Free throw shooting has less effect on winning and losing basketball games than any other CER factor." ¹²

One other effective method of evaluating the effect of field goal, free throw and rebound percentages upon winning is by studying the winning percentage of the top fifteen teams in each category. The top fifteen free throw shooting teams charted by the Offensive Efficiency Rating System in 1963-'64 won 66.5% of their games. The top fifteen teams in field goals in 1963-'64 rated a 67.6% winning percentage, while the top fifteen rebounding teams won 79.1% of their games. Table X shows that of these three categories, rebounding is most important and free throw shooting is least important.

TABLE X

EFFECT OF FREE THROWS, FIELD
GOALS AND REBOUNDING UPON WINNING

<u>FREE THROWS</u>		<u>WINNING %</u>
1963-'64	66.5%	TOP FIFTEEN TEAMS
1964-'65	57.3%	TOP FIFTEEN TEAMS
<u>FIELD GOALS</u>		
1963-'64	67.6%	TOP FIFTEEN TEAMS
1964-'65	67.8%	TOP FIFTEEN TEAMS
<u>REBOUNDING</u>		
1963-'64	79.1%	TOP FIFTEEN TEAMS
1964-'65	72.4%	TOP FIFTEEN TEAMS ¹³

¹²Ibid.

¹³Ibid., p. 28.

Rebounding of over 50% is a must for a championship team and was the number one reason for the success of the Clay Center team.

CONCLUSIONS

The Offensive Efficiency Rating System was designed by Paul R. Keller, a former high school coach, who resides at 16 Woodland Avenue, Delaware, Ohio. This method of evaluating a basketball team is the best method known to the author. The Offensive Efficiency Rating System is a chart of the points scored per possession, defensive efficiency, turnover percentage, field goal percentage, free throw percentage and rebound percentage.

In the four years previous to the 1966-'67 season, the author charted his teams using an offensive and defensive chart. These charts indicate the caliber of performance in a game by not only charting the team, but also the individual player. The performance of both team and individual could be studied to evaluate the improvement of the team and the individual.

In comparing the Offensive Efficiency Rating System to the defensive chart used in the previous four years, the author feels that the Offensive Efficiency Rating System is amazingly more valuable than the defensive chart.

The defensive chart is extremely valuable in one sense where the Offensive Efficiency Rating System does not work. This is in the area of individual play. The team, with the individual being a definite integral part of the team, cannot function properly if every player is not playing to his potential. For the player to reach his potential he must play

offense and defense, handle fundamentals, and rebound to the best of his ability, so that both the individual and the team benefit by his play. If the individual performs to his potential, then it is time to work on team play. Team play cannot be effective until the individual realizes his importance to the team.

For example, the defensive chart helps to show his offensive hustle and offensive play by charting his assists to other players, with the assists resulting in their score as well as the players shooting percentages. The defensive play of the individual is expressed by his rebounds, stolen passes, and defensive work that keeps the opponent from scoring. Each of these statistics helps to show the coach the value of the statistics.

The offensive chart shown on page 10 cannot be left out of the statistics picture. No player should play and not be able to see the results of his game in black and white. The offensive chart helps to show his game-to-game improvement. These statistics also, help to show the value of the player to the team and aids the coach in preparing and planning the following year for each of the scheduled opponents.

Without a doubt, after a year's use of the Offensive Efficiency Rating System, the author is convinced that it is the best method of evaluating the play of a basketball team. Some of the reasons explaining the value of the

Offensive Efficiency Rating System are as follows:

1. A running tabulation can be kept for each game.
With this running tabulation, the coach may compare any game in the year with any other game in the year. Primarily, the value here is when the coach can follow game-by-game the progress of his team. Basketball teams during a season will progress for a time, then reach a plateau for a short time, then continue upward until reaching another plateau, and then move forward again. The coach should know when the team stays on that plateau too long and has gone into a period of staleness in the performance of basketball procedures.

The Offensive Efficiency Rating, Defensive Efficiency Rating, and percent of time turning the ball over, truly give the statistical view of the progress of the team from game-to-game, and quarter-to-quarter.

2. The statistics are visible by charts; nothing has to be left to the memory of the coach, who while coaching a game must be thinking ahead and forget the mistakes that have been made. However, for the upcoming practices, he must look back to these mistakes in order to fully utilize each practice to fullest advantage.

3. Helps the coach to prepare practices more efficiently by following the weaknesses shown in the charts.
4. The defense tends to become stronger as a direct result of item number six. When shown that points are thrown away via turnovers, the players will work harder after a turnover in order to keep the opponent from scoring.
5. The four periods of ten possessions are extremely valuable to show where the strengths and weaknesses of the offense and defense occur throughout the game.
6. Most of all, the value of rebounding can not be over emphasized to the team, and the Offensive Efficiency Rating System recalls this clearly to the attention of the players and coaches. Rebounding is the most important factor in the success of the team.
7. The Offensive Efficiency Rating System offers an evaluation of not only how well or how poorly the team performed, but may be used to indicate the exact areas and frequency of occurrences of team weaknesses.

The author will continue using the Offensive Efficiency Rating System as well as the defensive chart in order to give

a full comprehension of the individual game and the team game. The Offensive Efficiency Rating System provides a much more satisfactory and complete evaluation of a game of basketball than does the offensive and defensive charts used previously. The fact that the study of the Offensive Efficiency Rating System helped the 1966-'67 team to a 20-4 record for the season is reason enough to continue using this method of statistical evaluation.

After a year's use of the Offensive Efficiency Rating System, this method of evaluating a basketball team is the best method known to the author.

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APPENDIX

There are MANY excellent reasons why you should purchase the OER System. A large number of these reasons have been listed elsewhere among the materials I have enclosed in this letter. Certainly the best reasons of all are the many wonderful letters of recommendations I receive from coaches every week of the year. Copies of several have been enclosed in this letter.

The OER System very proudly claims the Nation's No. 1 team, major college - Michigan University - and small college - Evansville College. This past year was the first for each team with the OER System. Many other teams, high school and college, won their league titles, advanced far in tournament play and came up with the best record in the history of their coaching career or of their school.

In the tough Ohio Conference of small colleges, an OER user won the league title for the fifth straight year, the only years the OER System has been available and used. This year, for the first time, a non-OER user tied for first place. As has been the case in the other four seasons, other OER users claimed most of the top spots. This past season (1964-65), OER teams placed third (Ohio Wesleyan), fourth (tie), fourth (tie), eighth (tie) and eleventh. The eleventh placer was made up mostly of freshmen and sophomores. Against non-OER users in OC competition, the

OER teams won 36 while losing but 18 for 66.7%. This has been the pattern ever since the development of the OER System by yours truly. There are 15 teams in the Ohio Conference.

Another reason for using the Offensive Efficiency Rating System is: I develop what I call my KIT SUPPLEMENT after each season. My initial effort came for the 1963-64 season and consisted of eight pages. I felt it was a good one and many coaches wrote me to that effect. Last year I increased this KS to 11 pages and I sold more than twice as many as I did the year before and an increasingly large number of coaches wrote me as to how beneficial, useful and helpful it was. Again, I only charge a dollar though I spend hundreds of hours working out the various stats and other items in this KS.

The stats in this KS come from many of the leading coaches in America and they will point out to you EXACTLY what it will take in the way of OER stats to WIN. It shows you what OER teams won with field goal shooting percents of 35% to 40%, from 40% to 45% etc., and how they won with TURNOVER rates of over 25%, from 20% to 25%, from 18% to 20% etc. Ditto for REBOUNDING and what a story these REBOUNDING stats will tell you. I carry out one or more "research" projects each year and I will have one or two pages of other very important information. All in all, this could be the best buy you ever made, the KS at a dollar....

....When you place your order for my KIT at \$15.00, you might choose to include another dollar for the KS. I will keep a record of your extra payments and you will receive the KS in the spring.

Paul R. Keller 16 Woodland Ave.
Delaware, Ohio, 43015

Some of the material offered by Paul Keller in his correspondence has been omitted because much of it is explanations of the type of season that teams throughout the country had completed. This involves the results of these teams in accordance with the Offensive Efficiency Rating System.

Following the first explanation of the thirteen items by Mr. Keller, he gave his interpretation of various ratings. This is as follows:

INTERPRETATION OF VARIOUS RATINGS

COLLEGES	.95 to .99 are GOOD ratings. Should win 60% or more of games.
	1.00 to 1.09 EXCELLENT. Win 95% or more of games.
	1.10 to 1.19 VERY SUPERIOR. Should seldom lose.
	1.20 and up. UTTERLY FANTASTIC.
HIGH SCHOOLS	.90 to .95. Win 75% of games.
	.95 to 1.00. Win 90% or more of games.
	1.00 and up. Almost never lose.

The following chart is one page from Mr. Keller's 1964-'65 Kit compiled after the season. This chart contains some high school teams using the Offensive Efficiency Rating System.

OER CHART 1964-1965 OER KIT

	Marion Harding, Ohio	Bellefonte, Illinois	Wagner, South Dakota	Luther South, Illinois	Louisville, Ohio	Fredericktown, Ohio	Jonathan Alder, Ohio	Fayette, Ohio
OER	.95	.91	.83	.94	.90	.94	.90	.95
DER	.85	.81	.74	.85	.65	.75	.71	.77
OER-P	1.19	1.24	1.05	1.24	1.14	1.28	1.15	1.17
Offense used	79.8	73.2	78.4	74.5	78.5	74.0	78.2	81.5
TO's	20.2	26.8	21.6	25.5	21.5	26.0	21.8	18.5
PTS. Lost	10.4	17.3	10.4	20.0	8.3	13.8	12.7	12.3
Poss. scored	46.4	49.2	41.6	47.1	51.1	45.8	46.1	47.2
Kept Poss.	58.1	67.2	53.1	62.6	65.1	60.9	58.3	58.9
S.P. due to TO	37.6	52.8	37.1	47.8	43.9	48.0	40.6	34.9
1st 10 Poss.	1.04	--	.70	.93	.89	.90	.89	.93
Last 10 Half	.85	--	.89	.91	.78	.94	.97	.88
1st 10 2nd Half	1.00	--	.84	.90	1.01	.99	.82	.95
Last 10 Game	1.06	--	.78	1.02	.87	.83	.82	.90
F. G.	44.9	41.6	35.5	47.6	42.9	41.2	42.8	40.1
F. T.	61.9	61.6	61.6	58.2	59.8	64.2	59.1	59.6
Rebound	50.9	59.0	59.7	54.9	57.5	60.0	56.4	51.3
Won	14	21	15	19	19	17	21	18
Lost	8	8	8	7	2	4	4	4

COMMENTS ON, ANALYSIS OF AND SOME INTERESTING AND
VALUABLE STATISTICS GLEANED FROM OER STATS FUR-
NISHED BY HIGHLY SUCCESSFUL COACHES

(1) RELATIONSHIP OF TURNOVER PER CENTS TO WINNING
BASKETBALL GAMES.

- A. Teams with 25% and greater turnovers WON 142
LOST 48 Pct. 74.7%
- B. Teams with 20% to 25% turnovers WON 160 LOST
52 Pct. 75.5%
72.6%
- C. Teams between 18% and 20% errors WON 122 LOST
27 Pct. 81.9%
76.6%
- D. Teams with errors less than 18% WON 54 LOST
12 Pct. 81.8%
85.6%

The per cents on the second line in B-C-D are those for the 1963-64 season. Only three teams turned in per cents less than 18%, all from Ohio. Tipp City, Xenia and Margaretta High Schools. Norfolk High School of Nebraska erred but 17.5% of their total possessions but did not have a winning season - percentage wise. The stats used in this KIT SUPPLEMENT are WINNING stats so that you can see what it takes to WIN -- BIG. All of these are high school stats. Several colleges achieved turnover percents below 20%. PLEASE SEE ANOTHER PAGE OF THIS K.S. THAT IS DEVOTED ENTIRELY TO TURNOVERS AND THEIR EFFECTS ON WINNING OR LOSINGYou should separate your turnover percents

in your WINS from those in your LOSSES and then COMPARE. Most of the time they tell you and your players quite a story on the value of ball possession.

(2) EFFECT OF REBOUNDING ON WINNING PERCENTAGES.

A.	Teams controlling less than 50%	WON 50	LOST 16
		Pct. 75.8%	
B.	Teams controlling 50% to 55%	WON 110	LOST 48
		Pct. 69.6%	69.4%
C.	Teams controlling 55% to 60%	WON 227	LOST 59
		Pct. 79.1%	76.9%
D.	Teams controlling over 60%	WON 91	LOST 16
		Pct. 85.0%	82.6%

It was most unusual to receive stats from WINNING teams with REBOUNDING less than 50%. All three quintets, however, had many other factors "GOING" for them. Since my intense study of the value of rebounding as projected into WINNING basketball clearly points out the almost absolute need for HIGH rebounding, the winning basketball at Pleasant High School (Ohio), Niles West (Illinois) and East Canton (Ohio) is REMARKABLE. If these teams could have "collared" around 55% of all the RB's, they might have won around 60 games against a half-dozen losses. I have found that, with the possible exception of turnovers

(LOW turnovers), that TOP REBOUNDING has most to do with WINNING basketball. OFFENSIVE rebounding gives a team two or three shots at the basket and this can give "life" to a poor-shooting team. DEFENSIVE rebounding makes a stronger defense by taking away the opponent's second and third shots. This enables a team to win without the need of a powerful offense, something you cannot always have. REMEMBER: DEFENSE is MORE consistent and dependable than offense. You will note that 41 of the 45 high school and college teams that won BIG, rebounded better than 50% with most grabbing at least 54% of all RB's. While shooting 50% from the floor can cover up a MULTITUDE of "ILLS", so can 55% and higher rebounding. It will pay you to work LONG and HARD EVERY night on all types of rebounding drills. Get ALL of your players JUMP CONSCIOUS. Except for lay-ins, you should never permit one of your players to take a shot unless two or more teammates are in POSITION to REBOUND. I CANNOT EMPHASIZE ENOUGH THE IMPORTANCE OF HIGH REBOUNDING PER CENTS. REBOUND. REBOUND. REBOUND.

COMMENTS AND ANALYSIS OF CER STATS AS
FURNISHED BY H.S. & COLLEGE CAGE
COACHES

(3) Effect of FIELD GOAL shooting on winning percentages:

- | | |
|---|-------|
| A. Teams shooting 35% to 40% WON 109 LOST 42 Pct. | 72.2% |
| B. Teams shooting 40% to 45% WON 311 LOST 82 Pct. | 70.4% |
| C. Teams shooting 45% to 50% WON 58 LOST 15 Pct. | 79.1% |
| | 78.1% |
| | 79.5% |
| | 72.2% |

Only three high schools turned in 45% to 50% FG shooting percentages. Tipp City of Ohio; Niles West of Illinois, and Luther South of Chicago, Illinois. Naturally, the lower your FG per cents, the HIGHER must be your REBOUNDING and the LOWER your TURNOVER per cents.

(4) Effect of FREE THROW shooting on winning basketball:

- | | |
|---|-------|
| A. Teams shooting 55% to 60% WON 136 LOST 37 Pct. | 78.6% |
| B. Teams shooting 60% to 65% WON 267 LOST 79 Pct. | 75.6% |
| C. Teams shooting over 65% WON 75 LOST 23 Pct. | 77.2% |
| | 74.0% |
| | 76.5% |
| | 80.4% |

You can easily ascertain from the above stats that free throw shooting has LESS effect on winning or losing basketball games than any of the other CER factors.

(5) Effect of TURNOVERS on POINTS LOST to opponent's:

- | | |
|--|-------------------|
| A. Over 25% of possessions being TO's Ave. points lost | 15.5 PPG |
| B. Between 20% and 25% | (11.6) 11.5 PPG |
| C. Between 18% and 20% | (9.96) 10.95 PPG |
| D. Less than 18% turnovers | (8.5) 9.04 PPG |

This PATTERN of "the higher the per cent of turnovers the higher the average number of points lost per game on errors", is one of the most CONSISTENT of all the CER statistics. Not only does your team lose points that it otherwise would get if it had held onto the ball, but MORE points are lost to the opposition as the error-rate increases.

REBOUNDING TIPS WINNERS?

There are four factors that can be rated that control the scoring of points in basketball: field goals, free throws, rebounding and turnovers. Of these four factors, all except TURNOVERS are rated nationally by the National Collegiate Athletic Bureau. Last year I carried out a research project to determine which one of these three factors had most to do with WINNING basketball. My findings were so valuable to coaches (based on the many letters of comments received from cage mentors all over America) that I decided to carry out the same project again this year and compare the results.

This year I figured the winning per centages from the top 25 major college teams in the Nation in (1) field goal shooting, (2) free throw shooting, and (3) rebounding... I found that the leading 25 teams in free throw shooting won 343 games while losing 256 times for a winning percentage of 57.3%. The top 25 FG shooting quintets came out victorious 408 times and lost 194 games for a very fine 67.8%. BUT, the top 24 (only 24 teams listed in the final RE stats) teams in REBOUNDING won 455 games and lost but 170 for the superior win-lose mark of 72.4%. So, for the second straight year, the top REBOUNDING teams had the BEST - WINNING PERCENTAGE.

As I said last year, if we had national ratings on TURNOVERS, this factor would either rate first or it would

be pushing REBOUNDING for the No. 1 contribution to winning basketball. My intense study of the OER teams' turnover per cents and rebounds and their effects on winning basketball games, clearly points out the TREMENDOUS part that BOTH play in this respect. However, this year, at least, it is REBOUNDING that has played the BIGGEST part in producing WINNING basketball. A team can lose the ball a "frightening" and "horrible" 26% of their possessions (or even higher) and still win because it is possible for them to FORCE their opponents into as high, or even into higher error rates. BUT, if your team grabs 55% of the total rebounds, there are only 45% available to your opponents. DEFENSIVE rebounding makes for a stronger defense and enables you to win without an all-powerful offense. OFFENSIVE rebounding gives you that important second and third shot and helps an average or a poor shooting team win games that it would otherwise lose.

If you do not rebound well over 50%, you either must be a HIGH field goal shooting team or one that plays with a very low turnover rate, or BOTH - if you WIN - BIG.

For comparison purposes, here are my findings of a year ago and for the 1964-65 basketball season regarding winning per centages based on FG, FT and rebounding statistics:

<u>FREE THROWS</u>	<u>WON</u>	<u>LOST</u>	<u>PER CENT</u>
1963-64	139	70	66.5% TOP 15 TEAMS
1964-65	343	256	57.3% TOP 15 TEAMS

FIELD GOALS

1963-64	140	67	67.6%
1964-65	408	194	67.8%

REBOUNDING

1963-64	168	43	79.1%
1964-65	445	170	72.4%

These stats certainly are REVEALING and they prove that you just cannot EMPHASIZE REBOUNDING ENOUGH. ALMOST ALL OER USERS WITH TOP WINNING MARKS SHOW REBOUNDING OVER 50%. IT IS ALMOST A MUST FOR CHAMPIONSHIP BASKETBALL. WORK AT IT.

HOW IMPORTANT ARE LOW TURNOVER PER CENTS?

Through the eyes of the OER System, I have seen many minor miracles performed by high school and college basketball teams through the medium of LOW TURNOVER PER CENTS. This year, I had a "special" interest in the performances of two quintets that used LOW TURNOVER rates for their outstanding accomplishments: Michigan University and Pleasant High School of Ohio. I will comment on the Wolverines here and you can read of Pleasant's success story on another page of this KIT SUPPLEMENT.

Everyone who follows basketball knows that Coach

Dave Strack's Michigan cagers won the always coveted Big Ten Title and were rated No. 1 in the final UPI and AP polls. What only a few persons know, however, is the large part that LOW TURNOVER PER CENTS, and LOW AVERAGE POINTS LOST ON ERRORS, played in enabling Michigan to win at least four or five of their very closely contested games.

This was the first year that Michigan University used the OER System and it usually takes several games before the FULL story of the OER EFFICIENCY permeates the basketball squad and the coaching staff. Several times during the first few games, Michigan's turnover per cents were more than 20% of their total possessions. However, Strack's cagers became increasingly EFFICIENT for the next few games, and, after eight contests, their average turnover rate was a GOOD 18.8% of their ball controls. The OER STORY was, apparently, already making progress and the close games, that would have otherwise been lost, were being WON by these LOW error rates. Michigan was also losing fewer points on errors than her opponent's were. This is one of the most important parts of OER EFFICIENCY. This EFFICIENCY even improved for the balance of the season as their turnover per cent for their remaining games was an OUTSTANDING 15% of their total possessions. For the season, Michigan's error rate was a SUPERIOR 16.8%.

An excellent example of how Michigan applied their fabulous OER EFFICIENCY is clearly shown in their NCAA Regional game with powerful Vanderbilt. They defeated the Commodores in a real thriller 87-85. While I charted this game by radio, I am CERTAIN that my figures are very close to being 100% accurate. A TOP announcer will enable a capable charter to do this type of work. I found Michigan with ten turnovers for a tremendously low rate of 12.7% and they lost but 8 points on these errors. Vandy also played well from a turnover standpoint as they were guilty of only 13 errors for an excellent 16.9%. BUT, they lost a WHOPPING 16 points on these errors to the WOLVERINES. Their "point spread" in regard to points lost on errors, was EIGHT in favor of Michigan and they won the game by only two points. Since Strack's cagers had accomplished this neat trick on several previous occasions during the regular season, this performance did not surprise me at all. As one other example, in their 80-79 "squeaker" over Illinois, Michigan lost but 5 points on errors compared with the Illini's 10 points. Michigan's turnover rate was an ultra-superior 7.5% while Illinois lost the ball on only 14.3% of their total possessions..... While the other three Michigan OER FACTORS for the past season were EXCELLENT, they were NOT SUPERIOR to the extent that you would expect a Big Ten Title or an NCAA runner-up

on the strength of them. You just do not call 45.8% field goal shooting as being responsible for winning the way the Wolverines did this past season. So, we must give credit to Coach Dave Strack and his cagers for using such a HIGH PERCENTAGE of their OFFENSE that they developed. Repeatedly, they would lose from five to ten points LESS on turnovers than their opponents. And they did not accomplish this record, nor their tremendous season's record because of their strong defense. Their average DER was TOO HIGH at .94 PPP compared to Ohio State's DER of .83 and .84 in Jerry Lucas' last two years of play..

.. There are two ways to go about reducing high turnover rates: drop from your offense those patterns or those things you are trying to do that result in HIGH error rates, or, through SUPERIOR COACHING, improve the timing, ball handling and other player techniques that would automatically result in lower turnover per cents.

REMEMBER: TURNOVERS KILL YOU. ALWAYS SHOOT FOR LESS THAN 20%.

AN ANALYSIS OF BASKETBALL EFFICIENCY RATING

by

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An Abstract of a Master's Report
submitted in partial fulfillment of the
requirements for the degree

Master of Science

Department of Physical Education

Kansas State University
Manhattan, Kansas

1967

The purpose of this report is to provide informative statistics for the 1966-'67 Clay Center Community High School basketball team, and to compare the Offensive Efficiency Rating System with the system already in effect at Clay Center.

In the Offensive Efficiency Rating System, the evaluation of team play is based upon thirteen (13) steps, plus rebound percentage, free throw percentage, and field goal percentage.

The following instructions show how to figure the thirteen items, as explained by Paul Keller.

Item 1 -- To find your team's Offensive Efficiency Rating, divide the total possessions into the number of points scored.

Item 2 -- You find your opponent's Offensive Efficiency Rating in the same way.

Item 3 -- To find a team's Offensive Efficiency Rating potential, subtract the number of turnovers from the total number of possessions and divide that figure into the number of points you score in the game.

Item 4 -- To find the percent of the offensive ability a team uses on a given night, subtract the percent of turnovers from 100%.

Item 5 -- To determine the percent of turnovers of the ball by a team to the opposition, divide the number of possessions into the number of turnovers.

Item 6 -- Divide the total number of points given up through turnovers by the total number of games played.

Item 7 -- Divide the total number of possessions into the total number of possessions on which points are scored to determine the percent of possessions scored on.

Item 8 -- Divide the KEPT possessions (total possessions minus the turnovers) into the number of possessions on which you score to provide details on the percent of kept possessions scored on.

Item 9 -- Divide the total number of times that the team fails to score into the number of turnovers for the percent of scoreless possessions due to turnovers.

Item 10 -- Merely add up the points scored in the first ten possessions of the game and divide by ten, to determine the Offensive Efficiency Rating for the first ten possessions of the game.

Item 11 -- Same as 10, but it is for the last ten possessions of the first half of the game.

Item 12 -- Same as 10, but it is for the first ten possessions of the second half of the game.

Item 13 -- Same as 10, but it is for the last ten possessions of the game.

A separate chart is used to designate the rebound percentage and field goal percentage; free throw percentages are tabulated from the scorebook.

These thirteen items may be determined from a single game chart which shows the possessions and the points scored on these possessions for the team and for the opponent of the team. This chart also entails a turnover chart explaining the amount of points scored as a result of the turnovers of the team and of the opponent of the team.

Goals were set by the coach for each of the items in the system to provide a challenge for the players. The players also had a goal of no more than four losses during the season.

Some of the most interesting statistics of the Offensive Efficiency Rating System are the four periods of ten possessions each; the first ten possessions of the game, the last ten possessions of the first half, the first ten possessions of the second half, and the last ten possessions of the game.

In the order of importance, the four major statistics affecting the Offensive Efficiency Rating System are rebounding, field goal shooting, turnover rate and free throw shooting.